

- 37 Hoeymans N, Feskens EJ, Van den Bos GA, et al. Age, time, and cohort effects on functional status and self-rated health in elderly men. *Am J Public Health* 1997;87:1620–5.
- 38 Suls J, Marco CA, Tobin S. The role of temporal comparison, social comparison, and direct appraisal in the elderly's self-evaluation of health. *J Appl Psych* 1991;21:1125–44.
- 39 Huisman M, Kunst AE, Mackenbach JP. Socioeconomic inequalities in morbidity among the elderly; a European overview. *Soc Sci Med* 2003;57:861–73.
- 40 Kunst AE, Bos V, Lahelma E, et al. Trends in socioeconomic inequalities in self-assessed health in 10 European countries. *Int J Epidemiol* 2005;34:295–305.

.....
European Journal of Public Health, Vol. 23, No. 3, 517–521

© The Author 2011. Published by Oxford University Press on behalf of the European Public Health Association.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

doi:10.1093/eurpub/ckr144 Advance Access published on 2 December 2011

Front-of-pack nutrition labelling: are multiple formats a problem for consumers?

Alizon K. Draper¹, Ashley J. Adamson^{2,3}, Sue Clegg⁴, Sally Malam⁵, Malcolm Rigg⁴, Sue Duncan^{6,7}

1 School of Life Sciences, Westminster University, London W1W 6UW, UK

2 Institute of Health & Society, Newcastle University, Newcastle upon Tyne NE2 4AX, UK

3 Human Nutrition Research Centre, Newcastle University, Newcastle upon Tyne, NE2 4HH, UK

4 Policy Studies Institute, Westminster University, London W1W 6UP, UK

5 TNS-BMRB, London SE1 2QY, UK

6 School for Policy Studies, The University of Bristol, Bristol BS8 1TZ

7 Policy Studies, Faculty of Health, Life and Social Sciences, The University of Lincoln, Lincoln LN6 7TS, UK

Correspondence: A.K. Draper, School of Life Sciences, Westminster University, 115 New Cavendish Street, London W1W 6UW, UK, tel: 020 7911 5000 (ext: 64620), fax: 020 7911 5028, email: a.draper@westminster.ac.uk

Background: Nutrition labels are a potentially valuable tool to assist consumers in making healthy food choices. Front-of-pack labels are a relatively new format and are now widely used across many European countries, but it is unclear which of the many formats in use are best understood by consumers. It is also unclear whether the existence of multiple formats impedes understanding and use. This article addresses this question with findings from a study commissioned by the UK Food Standards Agency to provide evidence to inform policy decisions in this area. **Methods:** In-depth qualitative interviews were used to explore consumers' decision-making processes when using two different front-of-pack label formats to judge the relative healthiness of a pair of products. Participants were presented with product pairs differently labelled and a series of structured prompts were used to access their internal dialogues and to identify any difficulties encountered. **Results:** The interviews revealed that making product comparisons using different label formats was challenging for participants and particularly for those product pairs where there was not an obvious answer. When the label formats on the product pairs lacked a common element, such as text, this also caused difficulties and misinterpretation. The comparisons also took time and effort that would be a deterrent in real-life situations. **Conclusions:** These findings indicate that the existence of multiple front-of-pack label formats in the marketplace may impede consumer comprehension and discourage use. They suggest that a single format may encourage consumers to use front-of-pack labels in making healthy food choices.

Introduction

The prevention of diet-related diseases, such as coronary heart disease and obesity, is a key public health priority within Europe and internationally.^{1,2} Their reduction requires a broad multi-pronged strategy. Nutrition labels are a potentially valuable tool in assisting consumers to make informed decisions about their food choice. Voluntary use of front-of-pack (FOP) labelling is relatively new and seeks to provide consumers with simplified 'at-a-glance' information to supplement that provided on back of pack (BOP) to help them make healthier choices. There are many types of FOP labels currently used in the EU and internationally that vary both in format and the type of information that they convey. These range from logos, such as the Dutch Choices logo, which provide summary information on the overall healthiness of a food, through to more detailed information on the amounts of individual nutrients contained in a specified portion size, which are

supplemented with information such as percentage of guideline daily amount (GDA) and/or traffic light (TL) colour coding (red, amber and green). Many food manufacturers and retailers within Europe have taken up these various schemes and multiple schemes now co-exist within many countries and also within individual food retail chains. An audit assessing the penetration of nutrition information on food labels in five product categories in the EU-27 plus Turkey³ found on average, 85% of the products contained BOP nutrition information and 48% contained FOP nutrition information, with the lowest penetration in Turkey (24%) and the highest in the UK (82%). Discussions on a proposal for a new EU Food Information to Consumers Regulation are drawing to a close and while the nutrition declaration will become mandatory (BOP), provisions for FOP nutrition remain voluntary. Member states will also have the ability to recommend additional forms of expression for FOP labels subject to meeting certain criteria. There are a range of views and little consensus on the form that FOP labels should take.

There is an extensive and growing body of research on nutrition labels that has been recently reviewed.^{4–6} These reviews show that while there has been much work investigating consumer use and understanding of different types of nutrition labels and logos, most of this has focused on reported use and understanding with relatively little work examining how consumers actually use labels and process the information they contain in real-life contexts. Further, while a number of studies have examined consumer understanding of individual FOP labels,^{7–10} these have all examined comprehension of a single label format and not when they are used in combination, for instance, to compare two products. None of the recent reviews^{4–6} identifies any research on the impact of multiple label formats on comprehension or use, but Campos *et al.* do note that barriers to consumer understanding need to be identified and addressed to promote appropriate label use. Given the number of different FOP schemes currently in use across Europe, there is a need to understand the consequences of multiple label formats in the market place on consumer use and comprehension and this is the policy relevant question addressed here.

The data presented came from a study commissioned by the UK Food Standards Agency in 2008. The study was conducted by TNS-BMRB in association with The Food, Consumer Behaviour and Health Research Centre, University of Surrey. The study addressed two initial research questions: how do consumers use FOP labels in real-life contexts (Stage 1) and how well do individual FOP schemes and their elements enable consumers to correctly interpret levels of key nutrients (Stage 2). A third stage was included to examine whether the co-existence of different FOP formats affects accurate interpretation by consumers, following a strong suggestion from early findings^{11,12} that the co-existence of different FOP schemes in the market place caused problems for consumers. The full programme of research has been reported elsewhere.¹³

Methods

The qualitative work in Stage 3 of the overall study was designed to explore whether there are difficulties for shoppers when using the different FOP label formats currently in the UK market place (GDAs, TL colour coding and combinations of these) in making product comparisons and, if so, to uncover the sources of difficulty and their effects. Fifty in-depth interviews were conducted in which participants were presented with pairs of different FOP labels (for either breakfast cereals or ready meals) and asked to make a healthier choice. This task was used, as earlier development work had

identified product comparison as a common use of FOP.¹⁴ A structured topic guide¹⁵ was used that focused on three areas that had emerged as salient: how people make comparisons when deciding which of two products is healthier, the decision-making process that they go through when making comparisons and what is important to people when making comparisons and decisions. Participants were asked ‘Using the information on these two labels, which of these two products do you think is healthier?’ for a pair of similar products labelled with different FOP labels. They were then asked to ‘think aloud’ about their decision-making processes, similar to the ‘talk aloud’ technique used by Higginson *et al.*,^{15,16} enabling any difficulties to emerge and to be used as the starting point to discuss their nature and source.

Four different FOP labels were used to represent those used by the main supermarkets in the UK (figure 1): a %GDA only label; a TL only label; a label containing %GDA, TL and text; and a label with %GDA and non-TL colour, where colour is a design feature, rather than indicative of nutrient levels (as in TL schemes). This label was used to explore problems with the interpretation of colour, when it was not part of a TL format, as this was identified as a source of confusion in Stage 1 of the study.¹¹ As many consumers shop in a variety of supermarkets purchasing a mixture of brand and supermarket own-brand products, they encounter the same or similar product categories with differing FOP formats. Therefore, shopping decisions may involve comparisons both across and within product categories using different FOP formats. The task presented to participants thus corresponds to a real-life purchasing decision when comparing two products. However, because packaging, claims, other labelling information and endorsements can influence purchasing decisions, the task involved comparison of label pairs in a test situation with no actual products presented. All other elements of packaging and presentation were absent as shown in figure 1, as the goal was to isolate and explore in more depth the difficulties described by consumers in the earlier ‘real-life’ research of Stage 1.^{11,12} Participants were presented with four pairs from a series of 24 label pairs and asked to decide which label represented the healthier product. The label pairs included some where there was no obvious answer as to which was the healthier product (for instance where some nutrients were higher on one label, but others higher on the second) to explore participants’ thought processes when the task was more complex. Label presentation was systematically rotated to maximize an even spread of presentations.

Participants were purposively recruited to ensure a spread across geographical areas (Brighton, London, Nottingham and Swansea),

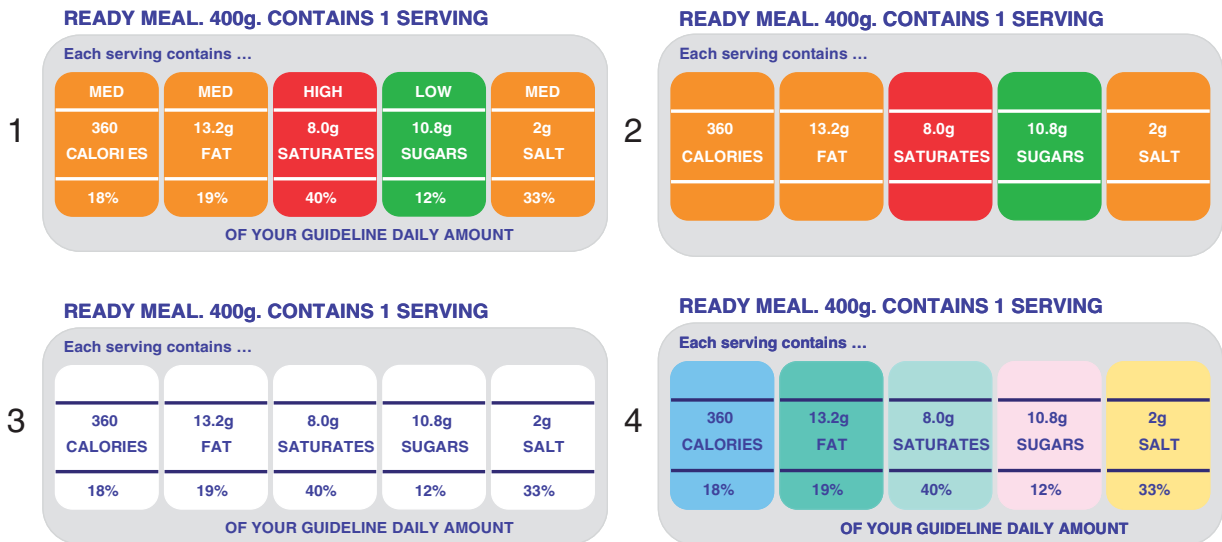


Figure 1 The array of labels used with the topic guide

users of the four main UK retailers (Sainsburys, Morrisons, Tesco and Asda), users and non-users of FOP labels, gender, age, household type, ethnicity and socio-economic status. Both users and non-users were included to allow examination of whether there is less confusion among label users and whether there were any specific issues that affected comprehension among non-users. While other studies have shown some degree of over-reporting of label use, this was explored further in the interview to ensure accuracy. There is no objective measure of familiarity, but again this was further examined in the interview. Participants were recruited using free find methods, with target quotas to find individuals who met the inclusion criteria. Free find recruitment entails quotas being set for recruiters who then find eligible participants in a particular area. The recruiters actively seek respondents rather than advertising for volunteers. This produces a purposive sample that reflects the diversity of the relevant population as is usual practice in qualitative research. Participants were screened using a short questionnaire to ensure a person's eligibility. Interviews were conducted in participants' homes January–February 2009 and lasted ~1 h. Participants were given £25 for taking part.

All the interviews were audio recorded, transcribed and analysed using matrix mapping. The data were synthesized into a framework based on *a priori* and emerging themes; the matrix was used to search for themes, similarities and differences which were then mapped out for further examination. This structured approach allows identification and mapping of key themes and issues, as they occurred across individual accounts, and the development of typologies and explanations.

Results

Table 1 shows the characteristics of the sample.

Table 1 Number of subjects by characteristics of the sample (26 label users, 24 non-label users)

	<i>n</i>
Geographic location	
Brighton	12
London	12
Nottingham	12
Swansea	14
Main retailer used	
Sainsburys	12
Morrisons	10
Tesco	16
Asda	12
Age group (years)	
16–30	14
31–50	14
51–64	13
≥65	8
Household type	
With children <16 years at home	19
Without children <16 years at home	15
Living as a couple	9
Not living as a couple	7
Ethnicity	
White	30
Asian	9
Black	11
Socio-economic status ^a	
AB	7
C1/C2	24
DE	19

a: Socio-economic status is a household-based proxy measure of social class based on the normal occupation of the chief income earner in the household categorized as—AB: professional, managerial and technical; C1: skilled non-manual; C2: skilled manual; D: partly skilled and unskilled; E: dependent on state and casual workers

The qualitative interviews revealed the nature of the decision-making process when judging the relative healthiness of products using different FOP labels, the nature of problems encountered and whether participants were likely to complete similar tasks in a real-life situation.

How decisions were made

Some information is common to all FOP labels, (i.e. weight of nutrient in grams) and some label types share common elements with other label types (i.e. text, TL or %GDA). The label containing text, TL and %GDA did not present problems for participants in making comparisons with either TL or %GDA labels, because they were able to use the common element to make the comparison. Participants were also able to make decisions on which product was healthier in some pairs simply by glancing at the FOP labels and, if unfamiliar with the scheme, they tended to resort to gram weights to make comparisons although some were unable to see this consistency. When asked how they were making the decision they were able to articulate clearly that the nutrient levels (weight in grams) were higher in one of the FOP labels, therefore they had chosen the other label as the healthier one. Participants also tended to 'home in' on one nutrient, such as salt, and then use the gram weights of this to make a decision. When participants were unfamiliar with any type of FOP scheme they were unsure where to start.

Participants experienced difficulties, however, in comparing some pairs of FOP label types, especially where there was no common element beyond the gram amount. For instance, when attempting to compare a label with TL colour but no %GDA (label 2) and with a label with %GDA but no TL colour (label 3):

It's like speaking different languages. I'm trying to compare French with German with English – why don't we just have everything in English, and then there's a direct comparison? But where we've got different details, it's pretty confusing.

Further difficulties were encountered with complex comparisons where some nutrients were high on one label and other nutrients high on the other label. In these situations, where a correct answer was not immediately obvious, participants developed a strategy to inform their decision. Many participants had an internal dialogue about the relative healthiness of individual nutrients, e.g. whether it was better to have higher sugar and fat or higher salt and saturates. Some participants considered one or two particular nutrients that they needed to keep low, with the choice depending on their personal circumstances and health status. However, the most usual way of deciding was to choose one or two nutrients as proxies for 'healthiness' and make a decision on those alone:

I'm looking at the fat and the salt. These are the two things I would look at a product for. I wouldn't be looking into saturates... because I don't think it's all that important... I suppose it hasn't registered that they're bad for you.

Participants indicated that while they were prepared to persevere with this relatively demanding decision-making process in an interview situation, while shopping they were unlikely to have done so and would have given up much sooner. It was not unusual for participants to comment that they would have become frustrated by the effort required.

To put it literally, it gives me a headache, and I just put it down. Perhaps I'd just go for something I'm used to... that's what I'd do.

I would get annoyed... because it should be easy.

Some participants said that they would have used other factors to make a decision, including attractiveness of the packaging or other labelling information, packaging health claims, nutrition claims, brand information or product familiarity.

Difficulties with specific label elements

Some participants saw an advantage in being able to compare GDA percentages in %GDA labels and text, TL and %GDA labels, because the common %GDA element allowed them to understand whether the differences in the levels of nutrients were big enough to matter or not. However, it was more usual that participants did not understand %GDAs and looked to other elements of the labels to make comparisons. One common misunderstanding was that the figure of %GDA represented the proportion contained in the whole product rather than the proportion of the GDA contained in a serving. In the example below, the participant believed that half of the meal represented by the label consisted of salt:

Because 45% [Salt on %GDA label] . . . that's, like, nearly half of the whole meal!

Further complications arose because shoppers did not understand how information in gram weight could be shown to be 0% of GDA:

I can't grasp that one.

Different uses of colour on FOP schemes also caused difficulties; in particular, the non-TL colours on %GDA labels caused confusion when making comparisons with labels using TL colour. Some participants thought that the colours on %GDA labels (both the pastel colours used in nutrient-specific schemes and monochrome colours) provided an indication of the level of nutrients present in a product, in the same way that TL colours provide this information. These were usually participants who were familiar with, and often understood, the TL colour scheme.

I'm confused with this one, as I said, red is for danger, but that's a cooler colour [non-TL coloured %GDA label], but yet it's got 68% . . . in here [TL label] there is only 56%.

Some participants were uncomfortable working with any numerical information (gram weights or %GDA) and relied on TL colours and text (high, medium and low) elements when they were present. Of all the label elements, text alone caused participants no difficulties in understanding:

I do like the High and Medium [Text labels] . . . because for people like me that want to go on a quick easy shop, that you want it basically told to you, rather than you trying to work something else out.

Other factors causing difficulties

Those with more confidence in their abilities to complete the tasks found the comparisons less daunting, although ultimately no less difficult. Familiarity with particular FOP label schemes did affect participants' confidence and willingness to engage with the various FOP labels. When participants tried to make comparisons between different label types there was often a 'pause' while they stopped trying to make the comparison and tried to work out what the differences between the labels were. This pause is of interest because it is the point where participants reported that they would be likely to give up trying in a real-life situation, abandoning the comparison due to frustration and falling back on other factors (e.g. other information on packaging). At this point, some people questioned why the labels were different, and why the food industry did not use a consistent labelling scheme.

I think it would be a lot easier if they were all just the same, 'cos I don't know why they'd need to be different – and you would maybe think "why has that got that on, and that one got that on – why are they them colours, and they are their colours' – if they all had [label with %GDA and TL], that would be really straightforward, you know what the colours are, you got the grams there if you want them, and the percentages, you can compare between.

Discussion

These data reveal that making comparisons using multiple FOP label formats poses problems for consumers, particularly, when there is no interpretive element in common; participants coped better when there was a common element. The kinds of problems that participants encountered correspond to the problems uncovered by Mitchell *et al.*¹⁷ in their proposed model of consumer confusion. Firstly, consistency was wrongly assumed across different label formats and notably non-TL colour coding was assumed to signpost the level of a nutrient by those already familiar with the TL scheme. This suggests that people are transferring meaning from a scheme they are familiar with to other FOP schemes, and sometimes inappropriately. The second source of confusion arose when consistent elements were obscured (gram weight of nutrient) by other differences in label format. These problems meant that considerable perseverance was required by shoppers to make comparisons of product healthiness using different FOP labels and beyond the effort most are likely to commit in real life. The label containing text, %GDA and TL colour overcame many of the problems that participants encountered by providing consistency and also allowing participants to use those elements that they were already familiar with. There was no evidence that the inclusion of all elements caused participants problems in identifying the relevant information.

As noted earlier, there are no other equivalent studies that have included a comparative assessment of the understanding of different FOP label formats to contextualize these findings, although participants in a recent Citizens' Forum on FOP labelling conducted in the UK wanted a standardized scheme, feeling it would be more user-friendly and hence easier and more convenient to use.¹⁸ Similarly, Kelly *et al.*¹⁹ found that Australian respondents reported finding multiple FOP label formats confusing and overwhelmingly wanted a single scheme and Feunekes *et al.*¹¹ also report that in their study conducted in Germany, UK, Italy and The Netherlands participants expect one labelling format across food products.

A limitation is that this study was conducted in a test situation and not during real-life shopping in a retail environment, but the task used corresponds to a common real-life shopping decision of product comparison. The exclusion of other product information, such as packaging and brand information, means that other factors that influence purchasing decisions were removed and that difficulties encountered by participants can be attributed the challenge of making a product comparison using different FOP formats. The data support the conclusion that making product comparisons using different label formats presents consumers with considerable challenges and also takes them longer. Feunekes *et al.*¹³ examined comprehension of single label types and found that the time taken to make an evaluation increases with the complexity of the FOP label. Other studies have also shown that time taken is one factor influencing label use.^{5,8}

There are many other factors that influence label use and food choice, and price is particularly important to those on a low income.²⁰ However, as Campos *et al.*⁶ note the relationship between use of nutrition labels and healthier diets is probably bi-directional with those whose diets are already healthier diets being more likely to use them, but also that appropriate labelling can promote healthier eating. Their review also shows that to maximize use and comprehension, particularly, among certain population groups (those who are older, of lower socio-economic status and from some ethnic minorities), it is vital to ensure that information on nutrition labels is both accessible and understandable. While these qualitative data were not analysed by socio-demographic difference, these groups were all found to have lower levels of comprehension in the main stage survey¹³ indicating the importance of minimizing any possible sources of misunderstanding and confusion such as that caused by multiple formats. The findings of this study thus indicate that, if FOP labels

are to achieve their potential in both informing food choice and encouraging healthy eating, they should be standardized to one format.

Acknowledgements

Thanks to all of the participants who took part in the research. Also to staff at the Food Standards Agency in particular Karen Powell, Rosemary Hignett, Claire Boville, Alison Tedstone, Jane Barrett, Robin Clifford and Cliff Gay; and to Monique Raats, Richard Shepard, Julie Barnett, Victoris Senior, Charo Hodgkins and Moira Dean at the University of Surrey. Key findings from the study were presented to stakeholders and media, 6 May 2009.

Funding

The study was funded exclusively by the UK Food Standards Agency, contract PAU 217.

Conflicts of interest: None declared.

Key points

- This is the first study that has comprehensively examined how people actually use different FOP labels to make comparisons and judgements about the healthiness of food products using different label formats.
- Lack of standardization in FOP labels, for instance, in the use of colour across schemes, causes confusion and can lead to incorrect inferences being made.
- Making comparisons across label formats was frustrating and time-consuming deterring usage in a real-life situation.
- Label usage and impact in promoting healthy food choices may be enhanced by achieving greater consistency in the FOP format.

References

- 1 Commission of the European Communities. *Promoting Healthy Diets and Physical Activity: A European Dimension of the Prevention of Overweight, Obesity and Chronic Diseases*. Brussels: EN, 2005.
- 2 World Health Organization. *Prevention Chronic Diseases: A Vital Investment*. Geneva: World Health Organization, 2005.
- 3 Storcksdieck S, Fernández-Celemin L, Larrañaga A, et al. Penetration of nutrition information on food labels across the EU-27 plus Turkey. *Eur J Clin Nutr* 2010;64:1379–1385.
- 4 Cowburn G, Stockley L. A review of European research on consumer response to nutrition information on food labels. *J Public Health* 2004;15:385–99.
- 5 Grunert KG, Wills JM. A review of European research on consumer response to nutrition information on food labels. *J Public Health* 2007;15:385–99.
- 6 Campos S, Davey J, Hammond D. Nutrition labels on pre-packaged food: a systematic review. *Public Health Nutr* 2011;14:1496–1506.
- 7 Grunert KG, Wills JM, Fernandez-Celemin L. Nutrition knowledge, and use and understanding of nutrition information on food labels among consumers in the UK. *Appetite* 2010;55:177–189.
- 8 Koenigstorfer J, Groeppel-Klein A. Examining the use of nutrition labelling with photoelicitation. *Qual Market Res* 2010;13:389–413.
- 9 Borgmeier I, Westenhoefer J. Impact of different food label formats on healthiness evaluation and food choice of consumers: a randomized-controlled study. *BMC Public Health* 2009;9:184–96.
- 10 Feunekes GIJ, Gortemaker IA, Wilems AA, et al. *Appetite* 2008;50:57–70.
- 11 Clegg S, Lawless S. *Comprehension and Use of UK Nutrition Signpost Labelling Schemes. Initial Insights from the Qualitative Phase*. London: Food Standards Agency, 2008.
- 12 Malam S, Clegg S, Lawless S, et al. *Comprehension and Use of UK Nutrition Signpost Labelling Schemes: Cognitive Testing Report*. London: Food Standards Agency, 2008.
- 13 Malam S, Clegg S, Kirwan S, et al. *Comprehension and Use of UK Nutrition Signpost Labelling Schemes*. London: Food Standards Agency, 2009.
- 14 BMRB Social Research & University of Surrey. *Comprehension and use of UK nutrition signpost labelling schemes: Scientific Rationale and Design*. London: Food Standards Agency, 2008.
- 15 Higginson CS, Rayner MJ, Draper S, Kirk TR. How do consumers use nutrition label information? *Nutr Food Sci* 2002;32:145–52.
- 16 Higginson CS, Rayner MJ, Draper S, Kirk TR. The nutrition label – which information is looked at? *Nutr Food Sci* 2002;32:92–9.
- 17 Mitchell VW, Walsh G, Yamin M. Towards a conceptual model of consumer confusion. *Adv Consum Res* 2005;32:143–50.
- 18 Stockley R, Jordan E, Hunter A. *Citizens' Forums on Food: Front of Pack (FoP) Nutrition Labelling*. London: BMRB Qualitative, 2009.
- 19 Kelly B, Hughes C, Chapman K, et al. *Front-of-Pack Labelling: Traffic Light Labelling Gets the Green Light*. Sydney: Cancer Council, 2008.
- 20 Nelson M, Erens B, Bates B, et al. *Low Income Diet and Nutrition Survey*. London: TSO, 2007.